

THEODORE ROOSEVELT GENIUS PRIZE ADVISORY COUNCIL

December 4, 2023

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The Honorable Debra Haaland
Secretary of the Interior
U.S. Department of the Interior
18th and C Streets, NW
Washington, D.C. 20240

Dear Secretary Haaland,

The Theodore Roosevelt Genius Prize Advisory Council (Council) met November 14-16, 2023, to discuss opportunities for technology innovations in the fields of protecting endangered species, managing invasive species, advancing nonlethal human-wildlife conflict, preventing wildlife poaching and trafficking, promoting wildlife conservation, and reducing human-predator conflict.

The Theodore Roosevelt Genius Prize Competition is a powerful reminder that such incentives can spark new innovation from people with diverse backgrounds. The Council commends the Department of the Interior (Department) for broadening its stakeholder base through this prize competition to include and elevate individuals, small organizations, youth, underrepresented groups, and underserved communities. Innovative individuals' passion, enthusiasm, excitement, and representation can catalyze interest, recruit buy-in, and influence the uptake and scaling of the technologies themselves.

The recommendations presented here, in non-priority order, arose from discussions following presentations by prize winners and were approved by the Council. They are a concrete roadmap for the United States Fish and Wildlife Service (USFWS) to help embrace its core value of innovation.

1. Encourage and amplify technological innovation

- a. Continue prize competitions in technological innovation for wildlife conservation.
- b. Support scale-up of wildlife conservation innovations.
- c. Develop a national award to recognize technological innovators in wildlife conservation.
- d. Establish new mechanisms, increase awareness, and amplify efforts by natural resource stewards working to protect endangered species.

Designated Federal Officer

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- 2. Leverage expertise to foster development and implement innovation**
 - a. Establish a nonlethal human-wildlife conflict reduction task force.
 - b. Establish a nonlethal human-predator coexistence and conflict management task force.
 - c. Incentivize use of social science data and local community engagement in nonlethal human-predator conflict resolution.
 - d. Integrate animal behavior-driven approaches when evaluating technological innovation.
 - e. Connect technological innovators (prize winners) to the Invasive Species Advisory Committee and the National Invasive Species Council.

- 3. Adopt innovations and new approaches for wildlife conservation**
 - a. Explore innovative technologies for nonlethally managing insects.
 - b. Expand the USFWS Center for Pollinator Conservation.
 - c. Preserve biodiversity by leveraging innovative biotechnologies.
 - d. Adopt consensus-based geospatial data standards to combat wildlife poaching and trafficking.

The brief justification for each recommendation are as follows:

1. Encourage and amplify technological innovation

- a. Continue prize competitions in technological innovation for wildlife conservation.**
Continue annual prize competitions in wildlife conservation to highlight the importance of the issue, empower nontraditional innovators, and encourage technological innovation. Through the last two rounds of the prize competition, it is clear that prize competitions are a tool that leverages, grows, and amplifies nontraditional groups' interest and technological innovation in tackling challenging conservation problems. Future competitions can build on the foundation of knowledge developed during the Theodore Roosevelt Genius Prize. Lessons learned include needing support for technological scale-up between ideation and implementation. Solutions may include a multiphase prize competition to bridge these gaps.

- b. Support scale-up of wildlife conservation innovations.**
Create a hub at USFWS to connect wildlife conservation technological innovators with federal agencies' business, entrepreneurship, legal counsel, and other resources that enable technology scale-up. The Council recognizes the need for mentoring, networking, and ability to access additional resources to take the technology from prototype to innovation implementation. Innovators have great ideas and need support in entrepreneurship.

- c. Develop a national award to recognize technological innovators in wildlife conservation.**
Develop a prestigious recognition on behalf of the Department for wildlife conservation (Nobel Prize, Medal of Freedom, etc., level of prestige) that becomes the highest honor in the field and draws worldwide attention. Honoring those individuals, groups, or

organizations that develop effective innovative technologies for conserving and protecting wildlife would effectively promote wildlife conservation nationwide. Not only would this reward technological achievements that enhance the future for wildlife, but the publicity would also promote wildlife conservation as a national priority.

d. Establish new mechanisms, increase awareness, and amplify efforts by natural resource stewards working to protect endangered species.

Establish a mechanism to promote the work of innovators protecting endangered species. The Theodore Roosevelt Genius Prize Competition identified previously unrecognized innovators. Endangered species protection and management in parts of the country are sometimes carried out by passionate groups of people or stewards of the land such as those that reside on private landholdings. These innovators may not have a monetary incentive to start a program to protect these species, but they are incentivized by their conservation ethic. They have already done and continue to do great things that are protecting endangered species. These individuals should continue to be recognized, and their technological solutions showcased so that new approaches can be amplified and spur new innovation.

2. Leverage expertise to foster development and implement innovation

a. Establish a nonlethal human-wildlife conflict reduction task force.

Establish a multi-agency task force of experts in nonlethal human-wildlife conflict resolution. The goal would be to identify and foster innovation for coexistence strategies related to non-predatory wildlife and to develop best practices for nonlethal protocols and recommendations for implementation. This task force of experts both from within state, tribal, territorial, and federal agencies as well as academics, land users, agricultural and conservation organizations will be recruited from external diverse disciplines, including international sources, to recommend emerging technology to minimize human and wildlife conflicts.

b. Establish a nonlethal human-predator coexistence and conflict management task force.

Identify and foster innovation for coexistence strategies and to develop best practices, protocols, and recommendations for implementation by establishing a task force focused on human-predator coexistence and conflict management. Chronic human-predator conflicts affect urban and rural communities across the United States. For many predator species, conflict with people can threaten their survival in the wild. The task force should be composed of experts from diverse disciplines (e.g., biological, technology, social science, cultural experts) within state, tribal, territorial, and federal agencies, conservation organizations, as well as academics, land users, and livestock managers. The task force, composed of national and international expertise, would ensure the latest tools and technologies are considered.

c. Incentivize use of social science data and local community engagement in nonlethal human-predator conflict resolution.

Integrate behavioral nudge strategies, informed by an understanding of human decision-making processes, offer promising avenues to cultivate coexistence between human communities and predators. By leveraging human behavioral insights, interventions can encourage responsible practices, foster greater awareness about predator behavior, and promote the adoption of preventative measures. Incorporating social science methodologies into innovative conflict reduction measures would foster sustainable coexistence between humans and predators, ultimately promoting the conservation of both wildlife and local livelihoods.

d. Integrate animal behavior-driven approaches when evaluating technological innovation.

Integrate input from those most knowledgeable about the natural behaviors of animals when considering new technology-based strategies. This approach often yields solutions that capitalize on natural animal instinct and behaviors to mitigate human-wildlife conflict peacefully and voluntarily. A better understanding of animal eating patterns, seasonal activity, social interactions, habitat use, sensory stimuli (sight and smell) that attract animals to or away from conflict areas, etc. provides a strong foundation for developing innovative technologies like the 2022 Theodore Roosevelt Genius Prize Winner Mineral Bin. This recommendation also applies to the task forces.

e. Connect technological innovations to the Invasive Species Advisory Committee and the National Invasive Species Council.

Create connections among Invasive Species Advisory Committee (ISAC), National Invasive Species Council (NISC), and technological innovators to resolve invasive species challenges to wildlife conservation and the environment. ISAC and NISC were established and furthered by Executive Orders 13112 and 13751. Their work constructively improves programs through policy and management while providing insight into new technological innovations.

3. Adopt innovations and new approaches for wildlife conservation

a. Explore innovative technologies for nonlethally managing insects.

Use the Center for Pollinator Conservation program as a model to explore innovative technologies for imperiled non-pollinator insects. Insect populations are declining by 1-2% annually due to harmful agricultural practices, climate change, light pollution, deforestation, pesticide use, pollution, invasive species, and more Wagner et al. (2021)¹. These alarming decreases need urgent technological solutions as insects are essential to human economies: insects are critical to thriving agriculture worldwide as they are pollinators, contribute to nutrient cycling, and serve as a biological control for weedy plant species. In addition, insects are vital to the survival of birds, freshwater fish,

¹ Wagner DL, Grames EM, Forister ML, Berenbaum MR, Stopak D. Insect decline in the Anthropocene: death by a thousand cuts. Proc. Natl Acad. Sci. USA. (2021).118: e2023989118. <https://doi.org/10.1073/pnas.2023989118>.

amphibians, mammals, and humans. In the United States, insects perform ecological services valued at an estimated \$57 billion annually. Insects are the most important driver of biodiversity and health ecosystems, and there is no replacement for their essential role in nature.

b. Expand the USFWS Center for Pollinator Conservation.

Expand the USFWS Center for Pollinator Conservation to enhance their leadership in coordinating and providing resources. The goal is to support land managers, decision and policy makers, scientists, program leaders, and others to develop technological innovation that addresses pollinator population decline.

c. Preserve biodiversity by leveraging innovative biotechnologies.

Coordinate with other agencies to provide leadership to organize, implement, and advance the national effort of preserving biodiversity in the form of cryopreserved biological materials for use in relevant, sound, novel scientific research and innovative biotechnologies that safely and appropriately enhance species conservation efforts. Further, we suggest that USFWS coordinate across agencies to provide guidance and parameters on how these technologies should be applied to increase effectiveness and ensure conservation objectives remain the highest priority. The momentum and interest in employing innovative biotechnologies including assisted reproductive technologies and genetic banking for saving endangered species has escalated rapidly in the last decade. Safely stored biological samples can provide valuable material for future conservation and research.

d. Adopt consensus-based geospatial data standards to combat wildlife poaching and trafficking.

Enhance inter-operability among illegal wildlife trade-related data sets through federal adoption of the voluntary, consensus-based geospatial data standards described by Gore et al. (2022)². These standards were developed through the engagement of many experts and have been validated across countries, flora and fauna, and sectors of the illicit supply chain. Their use could assist decision-making and inform interventions to reduce illegal wildlife trade. Many technologies to address illegal wildlife trade are species- or contextually- specific, minimizing their ability to have broad impact. Technologies that work across scales (such as Theodore Roosevelt Genius Prize winners able to data mine across online platforms, countries, taxa, etc. to support law enforcement) should be adopted.

Through the work of the Council, we recognize the need for new ways, partners, and perspectives to help solve our toughest conservation challenges while increasing the efficiency and effectiveness of existing processes.

² Gore, M.L., Schwartz, L.R., Amponsah-Mensah, K. et al. Voluntary consensus based geospatial data standards for the global illegal trade in wild fauna and flora. *Sci Data* 9, 267 (2022). <https://doi.org/10.1038/s41597-022-01371-w>

The Council appreciates the Department’s consideration of these recommendations and the 2022 and 2023 Theodore Roosevelt Genius Prize Competition recipients for sharing their innovative solutions to wildlife management challenges.

It has been an honor to carry out our advisory role. Should you have any questions or need more information regarding this matter, please contact Stephanie Rickabaugh, the Council’s Designated Federal Officer, at Stephanie_Rickabaugh@fws.gov or (571) 421-6758.

Sincerely,

Shelly Grow

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Shelly Grow

Co-Chairs

Theodore Roosevelt Genius Prize Advisory Council

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